APPENDIX D

(VERSION OF CLAIMS AS AMENDED HEREIN WITH MARKINGS TO SHOW CHANGES MADE)

(Serial No. 09/973,557)

VERSION OF CLAIMS WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended) An apparatus for performing a specific binding assay, the apparatus comprising:

a composite waveguide comprising:

a substrate comprising a first optical material of refractive index n_1 and having a first planar surface and an opposite second surface separated by a thickness and a surrounding edge, and

a waveguide film comprising a second optical material having a refractive index n_2 which is greater than <u>refractive index</u> n_1, said waveguide film disposed on said first planar surface of said substrate;

capture molecules, associated with said waveguide film, for interacting selectively with at least one type of selected analyte molecule;

a light source operably disposed to direct a light beam into said composite waveguide for propagation by total internal reflection therein;<u> and</u>

a light detection device positioned in a cone of collection angles, said cone of collection angles having an axis oriented substantially orthogonal to a plane of said waveguide film.

2. (Amended) The apparatus of claim 1, wherein said light detection device is positioned to detect light passing through said <u>opposite</u> second surface <u>of said substrate</u> of said composite waveguide.

11. (Amended) The apparatus of claim 9, wherein said input waveguide comprises an optical material having a refractive index n_3 and[has] a thickness of between about 0.5 mm and about 5 mm.

12. (Amended) The apparatus of claim 11, wherein said <u>precise</u> spacing layer comprises an optical material having a refractive index n_4, where $n_4 < n_2$ and $n_4 < n_3$, said <u>precise</u> spacing layer having a thickness selected to optimize evanescent coupling of light from said input waveguide into said waveguide film.

18. (Amended) The apparatus of claim 1, wherein said light [detector]detection device comprises a charge-coupled device.

20. (Amended) The apparatus of claim 19, wherein said sample reservoir contains a sample solution comprising a plurality of molecules of a selected analyte[,] and a plurality of tracer molecules, said tracer molecules being activated by evanescent light escaping from said waveguide film into said sample solution.

22. (Amended) The apparatus of claim 21, wherein said different types of said capture molecules are positioned at discrete locations from one another on a surface of said waveguide film.

26. (Amended) An apparatus for performing specific binding assays, the apparatus comprising:

a light source providing light of a first wavelength;

a composite waveguide comprising a substrate having a first planar surface and an opposite second surface, said substrate comprising a first optical material of refractive index n_1, and a waveguide film disposed on said first planar surface, said waveguide film comprising a second optical material of refractive index n_2 and including a first surface with a plurality of capture molecules secured thereto, each capture molecule of said plurality of capture molecules having a binding site which selectively binds a corresponding, selected analyte, said waveguide film also including a second surface adjacent to said first planar surface of said substrate; and

a light detector positioned to detect light of a second wavelength emitted through at least said waveguide film, said first and second wavelengths differing from one another.

30. (Amended) The apparatus of claim 29, wherein said light detector is positioned to detect light of second said wavelength emitted through said at least one window.

41. (Amended) The apparatus of claim 39, wherein said input waveguide comprises an optical material having a refractive index n_3 and[has] a thickness of between about 0.5 mm and about 5 mm.

42. (Amended) The apparatus of claim 41, wherein said precise spacing layer comprises an optical material having a refractive index n_4, where $n_4 < n_2$ and $n_4 < n_3$, and said precise spacing layer has a thickness selected to optimize evanescent coupling of light from said input waveguide into said waveguide film.

48. (Amended) The apparatus of claim 47, wherein said different types of said capture molecules are positioned at discrete locations from one another on [a]said first surface of said waveguide film.

52. (Amended) A composite waveguide comprising:

a substrate comprising a first optical material of refractive index n_1 and having a first planar surface and an opposite second surface separated by a thickness and a surrounding edge;

a waveguide film comprising a second optical material having a refractive index n_2 which is greater than refractive index n_1, said waveguide film disposed on said first planar surface of said substrate; and

capture molecules associated with said waveguide film and arranged in a plurality of discrete reaction sites on a surface thereof, each of said capture molecules capable of interacting selectively with at least one type of selected analyte molecule.

55. (Amended) The composite waveguide of claim 54, wherein at least one of said discrete reaction sites comprises capture molecules that are specific for a different selected analyte than [the]a selected analyte for which capture molecules of at least another of said [dscirete]discrete reaction sites are specific.

56. (Amended) A method for performing a specific binding assay, the method comprising:

providing a composite waveguide comprising a substrate, a waveguide film secured to said substrate, and a plurality of capture molecules on a surface of said waveguide film, opposite said substrate;

exposing said capture molecules to a solution including a sample that may comprise molecules of at least one selected analyte;

adding tracer molecules to said solution, each tracer molecule including a site capable of binding with at least a portion of a complementary capture molecule or at least a portion of said at least one selected analyte, each tracer molecule including a component that emits fluorescent radiation of an emission wavelength when exposed to radiation of an excitation wavelength;

introducing light of said excitation wavelength into said waveguide film; and

detecting light of said emission wavelength passing through said substrate.

59. (Amended) The method according to claim 56, wherein said providing said composite waveguide comprises providing a composite waveguide with [said]a substrate comprising a first optical material of refractive index n_1 and [said]a waveguide film comprising a second optical material of refractive index n_2.